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ABSTRACT

The State Higher Education Executive Officers' Task Force on Achieving National Education Goals found four issues of immediate concern to higher education one of which was the role of higher education in accelerating school reform. This document presents a set of recommendations on that issue. Schools and universities must establish high learning expectations and work together to implement them. Improved teacher preparation should be the responsibility of the entire higher education institution. Continuing professional education for teachers should be improved through local school input regarding the content and focus of programs and state incentives to higher education to develop programs. Colleges and universities should provide feedback on student performance to high schools. State higher education agencies should join with education and community partners to intervene early in building students' aspirations and preparation. Innovative partnerships between colleges and schools can build networks for sharing facilities, technology and faculties. State education agencies should create incentives and rewards for college and school faculties to work together on interdisciplinary approaches to curriculum development that encourage active learning. Joint planning activities at the state level can create new structures and support for colleges and schools to work together. Included are 29 references. (JB)

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CREATING THE PARTNERSHIP

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SHEEO Task Force on Achieving National Goals

August 1991

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STATE HIGHER EDUCATION EXECUTIVE OFFICERS

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Higher Education and School Reform:

Creating the Partnership

SHEEO Task Force on Achieving National Goals

August 1991

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SUMMARY OF RECOMMENDATIONS

The achievement of national education goals proposed by President Bush and the nation's governors will depend upon the actions of many partners and participants in the educational process. Fundamental to achieving any significant improvement in our nation's educational performance is closer collaboration across the levels of education.

The SHEEO Task Force on Achieving National Education Goals was established in 1990 to promote the discussion and implementation of strategies for achieving national goals and to report on these discussions to the governors and the President. The task force determined that the following four issues were of immediate concern to higher education:

- The role of higher education in accelerating school reform
- Continued improvement in undergraduate education, especially as it relates to teacher preparation, science and mathematics education, foreign languages and international education
- Improved delivery of higher education services to adults in such areas as continuing professional education, work force training, adult literacy and parenting skills
- Sustaining and accelerating efforts aimed at improving minority participation and success rates in higher education.

Over the past five years, SHEEO has made minority student achievement a priority commitment. In the 1987 publication, *A Difference of Degrees: State Initiatives to Improve Minority Student Achievement*, SHEEO set the charge for state higher education leadership to increase minority participation and success in higher education. We followed with *Building Coalitions for Minority Success*, the final report of a two-year Ford Foundation-funded effort that created models of state structures to improve minority baccalaureate achievement.

Now, we believe that state higher education boards should pay special attention to the area of school reform and the role of higher education in helping schools improve. Through this report, the SHEEO Task Force on Achieving National Education Goals calls upon each state to develop and implement a plan of action for school-college partnerships targeted at educa-

tion improvement. State higher education executives should provide the leadership for initiating such plans. They should involve a broad coalition, including state departments of education, community leaders and administrators and faculties from colleges and schools. Specifically, we recommend that the plans incorporate the following goals:

1. Establish high learning expectations. Students who choose to take courses such as geometry, calculus, laboratory sciences and foreign languages in high school greatly enhance their chances of participating and succeeding in higher education. SHEEO endorses strengthening course requirements for college admissions. But, we believe that more is needed. To ensure that *all* students succeed, colleges and schools must work together to re-examine the content of courses to see if it provides what students will be expected to know for college or work success; to evaluate how information is presented to students; and to change how student knowledge is assessed.

2. Improve teacher preparation. Preparing future educators for diverse teaching and learning environments will require fundamental changes in current college and university practices. Teacher education should become the responsibility of the entire institution. New teachers entering the schools should know their subject matter well and be able to tailor this knowledge to teaching strategies that will reach diverse learners. Teacher education should increasingly be conducted in clinical settings — with schools becoming teaching and learning laboratories. Efforts to increase the supply of minority teachers should be enhanced and expanded. Certification should be based on assessment tools that allow prospective teachers to demonstrate substantive knowledge, adaptation to school and class culture and ability to respond to diverse learning styles. State- and system-level structures should support new school-college relationships by establishing incentives and rewards for teachers and college faculty.

3. Improve continuing professional education for teachers. School improvement and the professional development of practicing teachers have common links. Local schools should have greater discretion in determining the content and focus of these programs with higher education playing a supporting role. State higher education boards should pro-

vide special incentive funding to encourage colleges and universities to develop creative continuing education programs that support school improvement. New standards for what teachers should know and be able to do, such as those being set by the National Board for Professional Teaching Standards, should influence the substance of professional development courses. Also, through new relationships, colleges and schools should develop evaluation models that not only assess teachers' skills and knowledge but also give teachers opportunities to document and reflect on their practice.

4. Provide feedback on performance. Data collection and analysis can be powerful tools for influencing changes in curriculum, as well as in learning and teaching, in schools and colleges. Colleges and universities that systematically report back to high schools on the performance of post-secondary students across subject areas create a vehicle for bringing education systems together to set common goals for student performance.

5. Intervene early to increase aspirations and preparation. Ensuring that all students succeed at every level of the education pipeline will require early outreach and intervention. State higher education agencies should join with a wide variety of education and community partners to build students' aspirations, encourage students to seek postsecondary education and prepare them for the rigors of the college curriculum. States should seriously consider programs with endowment or trust funds that pay future college costs of students who meet established criteria. To ensure long-term commitment and goal-setting, leaders of state education agencies should seek to build a political coalition in state capitals to increase public support for education at all levels.

6. Share facilities, technology and faculties. Innovative partnerships between colleges and schools expand existing resources and build valuable networks through which college faculty and school teachers may share successful teaching approaches. Schools and colleges should create a partnership that facilitates sharing of laboratory facilities and classroom materials, allows faculties to team-teach or engage in shared research and exposes students to new learning

opportunities through advanced technology that links schools and college campuses.

7. Create an integrated curriculum in mathematics, science and other fields. The ways in which teachers are taught influences how they teach in the schools. This principle applies for all disciplines, but is especially applicable to math and science where hands-on instruction, problem-solving and critical-thinking techniques are vital to student understanding and achievement. State education agencies should create incentives and rewards for college and school faculties to work together on interdisciplinary approaches to curriculum development that encourages active learning.

8. Create new structures and support for planning and collaboration. If schools and colleges are going to work together effectively, they will require new structures and financial support for those activities. The most successful way for these efforts to begin is through joint planning activities at the state level. State plans of action should support faculty involvement in the schools and include representatives from across education sectors and the community.

School-college collaboration should be a specific state budget priority. This could be done by establishing new structures, such as 2+2 programs that bridge high school and college curriculum through course work designed for grades 11 through 14, opening opportunities for high school students to enroll in postsecondary courses, and by creating competitive grant programs and other incentives that encourage schools and colleges to work together on teaching and learning strategies.

These goals are achievable. Examples of new school-college relationships and creative collaborative activities are available in many communities in every state. State higher education leaders are in opportune positions to build coalitions and to use these isolated efforts as the foundation for comprehensive and systematic programs that will improve the educational environment in all schools and increase the academic performance of all students.

PREFACE

In Fall 1989, President Bush and the nation's governors proposed six national goals to guide education policy in the decade ahead. This nation, they said, should:

1. Ensure that every American child enters school ready to learn.

2. Increase the high school graduation rate to 90%.

3. Assure that students demonstrate competence in mathematics, science, English, history, geography and other basic subjects.

4. Raise the achievement levels of American students in science and mathematics to make them number one in the world.

5. Ensure that every adult is literate and has the knowledge and skills to participate fully as a worker and citizen.

6. Rid schools of drugs and violence so that they are disciplined places where teaching and learning can thrive.

As powerful as such a proclamation is, the achievement of these goals depends upon the actions of a multitude of partners and participants in the educational process. Schools and colleges, teachers and faculty, parents and students all will need to redouble their efforts if we are even to approximate achievement of such lofty aims. Fundamental to achieving any significant improvement in our nation's educational performance is closer collaboration across the various education levels.

State higher education coordinating and governing boards in each state are one of those partners. We believe that states play an essential, if not central, role in education reform. We also believe that we have yet to realize our full and most creative potential in working with other partners in the enterprise, especially the elementary and secondary schools.

Therefore, SHEEO takes the position that the improvement of elementary and secondary education is dependent in large part on the active participation of the higher education community. The linkages between the two educational communities are pervasive and undeniable. A failure of the higher education community to recognize this linkage and its responsibility to enhance

student performance will limit the success of education reform. Further, it will promote cynicism about higher education's visibility and commitment to education improvement.

At the hearings of the National Education Goals Panel, SHEEO went on record in endorsing the national goals. The SHEEO Task Force on Achieving National Education Goals understands that higher education must become an active partner with the K-12 sector. We cannot afford to sit in the proverbial ivory tower while our education system is in crisis. We must share the responsibility to improve student performance at all levels.

SHEEO believes there are three important elements of the goal-setting and achievement process. First, goals must be established. We encourage all states to undertake such an exercise, using the national goals as a starting point for their own deliberations. Second, programs must be created and public support built. While financial and other types of support do not guarantee that these or any other goals will be achieved, neither are they irrelevant. To achieve the progress needed will require not less but more financial resources. As we seek that financial support we must look not only externally but internally in an effort to reallocate our dollars to more effective programs.

Finally, our progress toward achieving these goals must be measured. We should not avoid comparisons, no matter how damaging at first glance. We should not confuse the public with data, but rather inform it. At the same time we should broaden our understanding of the multiple talents that contribute to our society and improve our instruments to measure and monitor development of those talents.

The report that follows is the first of a series that seeks to respond to the President's and the governors' call for educational progress. It offers specific suggestions and programs for bringing schools and colleges into a closer working partnership. Although the report provides examples of many notable efforts, it should not be viewed as higher education's defensive attempt to recite all the good things that are happening, thus endorsing business as usual. Rather, we should use it to advocate change, articulate goals and chart a course to achieve these goals. Future reports will deal with the subject of measuring our progress and making needed reforms in higher education.

I would like to thank the SHEEO task force members for their valuable input and Esther Rodriguez, the principal author of this report.

We welcome your comments and suggestions.

SHEEO Task Force on Achieving National Education Goals
Ann Daley, Chair

CHANGING SCHOOLS - WHAT WE HAVE LEARNED

School reform is a movement to change and improve teaching and learning in America's elementary and secondary schools. It was triggered by the growing sense that students in our K-12 systems are not prepared to assume roles as productive workers in commerce, industry, science and technological innovation. U.S. students, some critics claim, are not competitive with students in other industrialized countries, such as Japan and Germany. This loss of competitive edge has grave implications for sustaining America's position as a leader in world markets.

The movement's first national voice was the 1983 report by the National Commission on Excellence in Education entitled *A Nation At Risk*. That report pronounced the grim judgment that "the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a nation and a people." The commission's report was not limited to K-12 education, however. It outlined an agenda premised on excellence in education at all levels, with the goal of creating a "learning society." Its list of recommendations included:

- Strengthening the requirements for high school graduation and college admissions
- Requiring schools, colleges and universities to adopt more rigorous and measurable standards and higher expectations for academic performance and student conduct
- Increasing the time students spend on educational endeavors by more effective use of the school day and by lengthening the school day or school year
- Setting higher standards for teacher preparation and admission to the profession with increased salaries that are professionally competitive, market-sensitive and performance-based
- Supporting the reform agenda through leadership and fiscal support.[1]

Since the release of this report, the rationale for school reform in 1983 — international competition — has been expanded to include additional challenges. Changes in social needs, the environment, business and industry and

the economy require an educational system that can renew itself as needs change. Also, diversity within the student population — in culture, race, ethnicity, language, values and learning styles — requires a dynamic system that adjusts to students rather than forces students to fit the system.

Both the process and the substance of change are still evolving. Today, the goals for school reform reflect a more systemic approach to change than suggested in early reports.

Current recommendations include:

- Daily decision making should be moved from a central location to the school building.[2]
- Instruction should be more individualized and centered on an active-learning process in which students are coached and challenged.[3]
- Student assessment should be broadened to examine multiple talents through a wider variety of tools, including portfolios, videos and student interviews.[4]
- Course content should encourage an interdisciplinary approach.[5]
- Basic-skills instruction should integrate critical-thinking and problem-solving techniques.[6]
- Teachers' knowledge and skills should be continually upgraded through innovative inservice training programs and continuing professional education.[7]
- Assessment tools that drive teaching and learning should be targeted at learning outcomes.[8]

This paper will reflect in part how higher education is responding to school reform. It will also demonstrate cases where these actions conflict with school reform activities and where they complement them. Finally, it will suggest recommendations for finding some common ground and broadening the higher education agenda. Higher education must assume a direct, active role in creating and contributing to a school/college partnership that creates enhanced learning environments for all students.

WHERE HIGHER EDUCATION CAN CONTRIBUTE

1. *Establish high learning expectations*

The reform goal that probably has found the greatest consensus among state and federal policy makers is that all students be provided every opportunity to reach their highest achievement potentials. This implies that every option for future academic or career endeavors should be open to students despite conditions such as poverty, dysfunctional home environments or rural isolation. The quality of educational programs in all schools should be strengthened, and college preparatory curriculum, laboratories, libraries and other vital resources should be made readily available to all students. Schools and colleges should raise performance expectations for themselves as well as for students.

There is an abundance of evidence showing that students who enroll in a core academic curriculum tend to complete high school and succeed in college and the work place at higher rates than those in general education programs.[9] For example, data from the High School and Beyond 1980 sophomore cohort show that approximately 50% of students whose higher education concentrations were in areas such as engineering and natural sciences took significant science coursework in high school.[10] Even stronger evidence is found in analyses done by the College Board of the coursework that leads to high performance on the SAT exam (considered a predictor of college success). Students who had advanced as far as calculus in high school, for example, had an average total score of 601 (out of a possible 800). Those students who had not taken college preparatory math courses were 24 points lower than the national average in the verbal test and 30 points under the average on the math test. In short, College Board officials noted, "there is no doubt that those students who take more challenging courses tend to do better [on the exam]."[11]

Another recent College Board study shows that students who select courses such as geometry, laboratory sciences and foreign languages in high school and indicate plans to finish college are almost certain to attend college regardless of race, ethnicity or low-income. Using data from the High School and Beyond high school class of 1982 cohort, the study noted the following findings:

- About 47% of African-American students in general attend college within four years of high school graduation. Those who stated that they planned to complete their college degree attended college at a rate of 74%. About 80% of African-American students who took geometry attended college. When students who said they intended to finish their college degrees also took high-school geometry, they had an 85% chance of attending college.

- About 45% of Hispanic students and 58% of white students in general attend college within four years of high school. Those who stated that they planned to complete their college degree attended college at a rate of 77% and 88%, respectively. Also 82% of Hispanic students who took geometry attended college. When Hispanic students who intended to finish their college degree also took geometry, they had a 95% chance of attending college. The rates shift slightly for white students. About 83% of those who took geometry attended college. When those who intended to finish their college degree also took geometry, they had a 93% chance of attending college.

- Seventy-one percent of the poorest students who take geometry attend some college within four years of high school, while only 36% of those who do not take geometry do so.

- An analysis of all students shows that only 5% of those who had less than one year of geometry attained a bachelor's degree or senior status by June 1986 as compared to 29% of students who took at least one year of geometry. Statistics for minority students are more dramatic. For example, the odds of an African-American student attaining a bachelor's degree or senior status without at least one year of high-school geometry are one in 40. Comparable odds for Hispanic students are less than one in 60.[12]

Relying on these data, states have implemented policies that increase academic course requirements for high school graduation and college admission.[13] Many postsecondary institutions are requiring high school students to take more coursework in subjects such as math, sciences and foreign languages as a condition of admission. The institutions defend the policies by citing evidence that they improve student knowledge in basic

skills and other academic areas and help build student goals for college attendance. Also, they say the policies have forced schools to "beef up their curriculum" by adding course offerings and counseling services.

Some states collect data on the performance of college students and can directly link high school academic curriculum with improved student achievement. For example in Missouri, the Coordinating Board for Higher Education has used data from its Student Achievement Study to demonstrate the impact a rigorous college preparatory curriculum has on student preparation for and achievement in college. This study shows that Missouri's high school students who took college core courses scored over three points higher on the ACT and obtained a college grade-point average 0.3 points higher than students who did not take the core courses in high school. The reports are distributed to public and private high schools and to participating colleges and universities in the state.

Such policies appear to encourage more high schools to offer academic courses and more students to enroll in them. Given the research suggesting that student choice of courses in high school can make a difference in college attendance, schools and colleges should give more consideration to raising student aspirations for college and examining the advisory roles of school personnel so that *all* students are encouraged to participate in these core academic courses.

However, increasing course requirements and student enrollments alone may prove insufficient to meet higher expectations in the long term. Schools and colleges should know and understand the student populations they are serving and provide educational services to meet their needs. Creating opportunities for students with varied learning styles and preparation will also require schools and colleges to: (1) re-examine the content of courses to see if it provides what students will be expected to know for college or work success; (2) evaluate how information is presented to students, i.e., whether it holds their interest and integrates real-world occurrences; and, (3) change how student knowledge is assessed. Some new assessment tools (e.g., portfolios with written reports demonstrating problem-solving ability and analytical skills and videos showing performed experiments or artistic talents) should be critically reviewed. Acceptance of these new assessment tools by college admissions officers would encourage their use by high schools.

2. *Improve teacher preparation*

The school reform agenda has attempted to influence teacher preparation in four areas: (1) strengthening the programs that train teachers, (2) strengthening the preparation and achievement of students entering teacher preparation programs, (3) providing adequate measures of skills and abilities teachers need to teach all students in all schools, and (4) developing the policy structures that ensure strong programs and ease student entry into the profession.

As a primary response to strengthening teacher education programs, higher education institutions raised admissions standards, initiated exit standards and began to establish links with local schools. In fact, today these practices are fairly commonplace. A recent survey by the American Association of Colleges for Teacher Education reported that:

- More than 90% of respondents have raised entrance standards on their campuses.
- Seventy-five percent have established exit standards.
- More than 70% have undertaken partnerships with elementary and secondary schools.

These initiatives send an important message about the need for qualified individuals to enter the teaching ranks, but they generally have not influenced the way higher education institutions do business. Missing is the commitment to change American education.

Reaffirming the Commitment. Some institutions recognizing the need for immediate change have taken the lead in reaffirming a commitment to children and to teacher education. One example is the Renaissance Group, a national consortium of 12 institutions whose missions are founded on teacher preparation. The group recently released a set of principles based on the beliefs that colleges and universities have to respond to changing conditions, that schools and colleges must improve and must be active in leading education into the next century. The following are some of the principles the group has pledged to support:

1. The education of teachers is an all-campus responsibility.
2. Programs for the preparation of teachers thrive in a university culture that values quality teaching.
3. Decisions concerning the education of teachers are the shared responsi-

bility of the university faculty, practitioners and other related professionals.

4. The initial preparation of teachers is integrated throughout the student's university experience and is not segmented or reserved for the student's final year.

5. Rigorous learning expectations and exit requirements characterize the program to educate teachers.

6. The academic preparation of teachers includes a rigorous general education program, in-depth subject-matter preparation and both general and content-specific preparation in teaching methodology.

7. Teacher education programs reflect American diversity and prepare graduates to teach in a pluralistic and multicultural society.

8. The education of teachers incorporates extensive and sequenced field and clinical experiences.

9. Quality teacher preparation programs have faculty who are active in scholarly and professional endeavors.[14]

In addition, a number of institutions have moved to redesign teacher preparation programs, establishing in their place professional development schools, professional practice schools and clinical schools.[15] Following the principles advocated by John Goodlad, the state of Michigan and educators at Michigan State University, the University of Michigan and Wayne State University joined with public school personnel to design and implement a new structure for teacher preparation. The Michigan Partnership for New Education brings the research capabilities of the universities to the public schools to develop, test, evaluate and share new methods of teaching and learning. The program is modeled on teaching hospitals. Eighteen to 24 public schools across Michigan will provide a forum for university faculty, school faculty and students to develop, test and demonstrate new approaches to teaching and learning. The partnership focuses on three principal areas:

- Creating working models of education reform
- Improving the capacity for statewide education reform
- Improving public knowledge and participation in education reform.[16]

Another similar program called the Southern Maine Partnership is a collaboration of the University of Southern Maine and 18 school districts. Like the Michigan Partnership, the program has a dual agenda of renewing both the schools and teacher education. Some of the schools involved in the partnership will work with University of Southern Maine's College of Education to develop professional development schools — exemplary sites for teacher education. Another feature of the program offers professional development for teachers, counselors and administrators through educators' groups. Some examples of the groups' activities include:

- Mathematics institutes for teachers and students
- Ways to teach critical thinking, informed decisionmaking, creative problem-solving and community service
- Readings and discussion of select adolescent literature with a focus on multiculturalism

A Focus on Content. A second reform focus for improving teacher education is strengthening the preparation and achievement levels of participating students. In addition to increasing admissions requirements, the programs are equipping prospective teachers with a stronger background in the subjects they plan to teach. Many states have eliminated the education major or have limited the number of education courses students should take before graduation. Increased emphasis is being placed on the liberal arts and other academic disciplines. For example, in Connecticut and Massachusetts all graduates must major in the subject they plan to teach or in a special interdisciplinary major designed for those wishing to teach in elementary grades. California requires students entering teaching to major in a liberal arts discipline. In Colorado, education students are limited to 42 hours of teacher education courses, including student teaching, and Michigan and New Jersey have similar requirements.[17]

While critics concede that these requirements have raised the average academic profile of the education student, they argue that teaching still is not attracting aspirants of the quality and diversity it needs.[18] They maintain that focusing only on grades, course load and test scores relieves institutions from dealing with attitudes of prospective teachers, such as how well they work with diverse learners, with adults and as part of a team.

Some states and institutions are responding to this need. The University of Wisconsin System, for example, recently released a plan designed to meet three goals: (1) to prepare teachers to address the needs of a changing school population, (2) to prepare teachers to teach the knowledge and skills required by changes in society and in the work place, and (3) to structure teacher education programs to accomplish the first two goals.[19]

Project 30, a consortium of 32 colleges and universities from across the country, contends that in addition to requiring knowledge of subject matter, teacher education programs should provide students with teaching strategies tailored to specific subjects. The group represents a collaboration of education schools and colleges of arts and sciences and proposes to redesign teacher preparation programs so that pedagogy and content knowledge are integrated. One Project 30 program at Brooklyn College in New York provides students with a complete sequence of integrated studies. Students take interdisciplinary courses in comprehensive core areas — social sciences, arts and humanities and natural sciences. Instruction in educational theory and practice comes in a series of "studio courses" that relate directly to the interdisciplinary curriculum.[20]

Needed: More Minority Teachers. Many new initiatives are under way to increase the number of minority students entering teaching. In Connecticut, the Teaching Opportunities for Professionals (TOP) program allows currently employed paraprofessionals to work half of the school year and take courses toward a bachelor's degree and certification requirements the other half of the school year. The district pays the paraprofessionals' salaries, and the state pays a substitute paraprofessional to work during the six months the regular employee is in college. Although not specifically geared toward minorities, more than 80% of those participating are minorities. A similar effort is under way in the District of Columbia.

In Maryland, Massachusetts, Michigan and New York partnerships between two-year and four-year institutions use the community college as the point of access for many minority students who wish to enroll in teacher education programs. In Tennessee, the state department of education, the Tennessee Education Association and the governor's office jointly sponsor Partnerships to Assist School Success. This initiative encourages partnerships among schools, business organizations, civic organizations, churches, parents and higher education institutions to im-

prove the chances that minority students will succeed in school and ultimately enter the teaching profession.

The Virginia state legislature provided financial support to Virginia State University to establish a National Teacher Examination (NTE) Performance Improvement Project. The program was developed to increase the supply of minority teachers without lowering standards. It has a number of features designed to increase African-American student performance on the NTE; for example, diagnostic/prescriptive test measures the strengths and weaknesses of freshman education majors and provides programmed computer instruction for NTE academic subject and preparation. Several strategies have been adopted to inform minority students early about the nature of teaching and the opportunities for future teaching careers.

The California Mini-Corps, recruits and financially supports students from migrant agricultural families interested in pursuing undergraduate degrees and teaching certificates. It is funded under the Chapter I Migrant Education Program of the federal Elementary and Secondary Education Act. Migrant students who are bilingual and aspire to teach are involved in various activities including:

- Pre-teaching experiences as teacher aides in rural communities
- Role model training provided by the colleges and universities where the students are enrolled
- Academic support and guidance

The program was created in 1967 and enrolls more than 200 students per year. It is used as a model for proposed federal legislation calling for a national mini-corps aimed at increasing the pool of bilingual teachers by creating incentives and support for migrant students to enter postsecondary teacher education programs.

New Assessment Tools. The third reform focus is on new assessment models that allow teacher education students to demonstrate knowledge, adaptation to school and class culture and ability to adjust to diverse learning styles. A few states are reviewing some of these models. For example, the proposed revised NTE will measure subject competency, pedagogy and applications by using multiple tools (e.g., essay tests, multiple-choice tests, classroom observation and interviews).[21] Connecticut and Wyoming are developing new certification processes which will focus

on the skills and concepts teachers need to work successfully with diverse students. The assessment process will move from paper-and-pencil tests to requiring teachers to demonstrate, for example, how they combine understanding of instruction with knowledge of subject matter, how they use curricular materials, how well they assess the effects of different teaching approaches on learning and how well they can recognize and deal with students' misconceptions that might interfere with understanding subject matter.[22]

New Policies. Finally, policy structures must support strong teacher preparation programs and facilitate entry into the profession. The University of Wisconsin System strategic plan mentioned above advocates a collaborative process that will involve colleges and schools in a variety of ventures, including:

- Instruction for precollege students
- Transition programs for students going from high school to college
- Staff development for teachers
- Preservice teacher education programs in schools
- Programs for educational personnel at the preservice, induction and inservice training levels
- Joint development of "learning laboratories" in which mentor or master teachers would work with teacher candidates.

To encourage these new relationships, the plan recommends incentives for faculties from both higher education and schools. For school teachers, rewards might include access to graduate training and equal footing with university instructors in designing and implementing curriculum strategies. For college faculty, field-based instruction could be recognized through promotion, tenure and salary decisions. The Wisconsin Plan also calls for current funding formulas to be restructured to meet needs of schools, colleges or divisions of education.[23]

3. *Improve continuing professional education for teachers*

Historically, higher education has controlled the formal process by which teachers earn their credentials. With few exceptions, teachers take postsecondary coursework as criteria for salary increases, to fulfill continuing certification requirements, for graduate

degree attainment and for professional development. According to both teachers and researchers, many of these programs lack rigor and substance and fail to adequately address issues related to improving teaching and learning in the schools.

One new approach calls for professional education practices that give greater discretion to local schools, with higher education playing a supporting role.[24] The schools and their staffs would be central to a new form of learning laboratory. As in the professional development schools discussed previously, teachers could work collaboratively with university faculty in a variety of activities, such as teaching courses at the university or designing and implementing research projects and curricula. Such an approach fits well with the new site-based management philosophy of school reform.

A few states are supporting this reform by tying staff development to school improvement. For example, Minnesota provides districts $10 per pupil to design and conduct continuing professional education programs. In Arizona, professional education is coordinated with state goals. The state offers academies for primary (K-3) educators and middle school educators in math and science and the Arizona Leadership Academy for site-based teams.

Another state-sponsored program uses parent-teacher partnerships to improve children's mathematical abilities. Illinois provides funding for school-college partnerships for teacher inservice training. The money comes from the state's Title II allocation of the federal Dwight D. Eisenhower Mathematics and Science Education Act. To qualify for funds, higher education institutions must show the training services they propose to provide have been developed jointly with schools to meet specific improvement goals identified by the schools. More state programs of this type will influence higher education and schools to work together on local strategic plans that set goals for educators, schools and districts.

National Standards. The benchmarks of teaching excellence being developed by the National Board for Professional Teaching Standards should also encourage changes in the content of continuing professional education. The board, created in 1987 by the Carnegie Forum on Teacher Education and the Economy, will assess teachers for a new professional credential. The credentials presumably lead to enhanced positions and salaries for practicing teachers. Certification will be based on five core principles:

- Teachers must be committed to students and their education, understand how students develop and learn and recognize their individual differences.

- Teachers must have a "rich understanding" of the subjects they teach and how to teach them to all kinds of students.

- Teachers must possess a range of instructional techniques, know when and how to use them, be able to assess students' progress and explain student performance to parents.

- Teachers must be models for their students, demonstrating the traits they want their students to develop, such as curiosity, tolerance, honesty and the abilities to reason and solve problems.

- Teachers must be part of "learning communities," working with other professionals on curriculum and staff development and allocation of school resources.

These standards also can be used to influence schools and colleges to work together on innovative approaches for teacher evaluation. In districts where reform is under way, teacher evaluation is being used to serve two purposes: to promote professional improvement and ensure accountability. Within this context, evaluations provide teachers an opportunity for reflection and for rethinking their goals and priorities. One effort supporting this is the Teacher Assessment Project at Stanford University. The project investigates alternative ways of assessing teachers' skills and knowledge. One strategy is to use portfolios to demonstrate a richer, more contextual assessment of teaching. Because portfolio development is intended to be collaborative, teachers are encouraged to consult with peers in their schools, colleges and universities and other arenas to help them document and reflect on their practice.

4. *Provide feedback on performance*

Data collection and analysis can be powerful tools for influencing changes in curriculum, as well as in learning and teaching, in schools and colleges. The data can be used to:

- Provide measures for determining student achievement

- Evaluate progress of schools, colleges and universities toward increasing participation and success

of diverse student populations

- Evaluate the strength of policies and programs used to achieve reform objectives.

State higher education boards in some states require institutions to collect data on the status of postsecondary students and to report that information back to the high schools. These reports generally include information on the students' academic and enrollment status and grade-point average across subject areas.

Results of one example mentioned earlier, Missouri's Student Achievement Study, are distributed to all Missouri high schools to report on the performance of their graduates in the state's public colleges and universities. The study began with the entering freshman class of fall 1986. The board is beginning to analyze the data to answer important questions about the performance of Missouri's high schools and colleges. The reports to high school superintendents will show how many of their 1986 graduates enrolled in college in fall 1986 and either graduated from a Missouri college by spring 1991, are still pursuing their degrees, transferred, or are no longer enrolled. The board will present these profiles in terms of the number taking college preparatory courses in high school, ACT entrance test scores and the students' performance in college.

Some states add information on employer and student satisfaction. For example, Missouri also plans a study to assess recent college graduates' attitudes toward their collegiate experience. Another study will survey the state's businesses and industries to obtain their perception of how well Missouri college graduates were prepared. Survey data from both studies will be linked to the Student Achievement Study database to enable the state to analyze how state high schools prepared students for higher education and the work force. Board staff report that these findings will not only be used to inform public policy related to higher education, but also to benefit and influence change in Missouri's high schools.

Unfortunately, the Missouri example is not the norm. In most cases, such data are not being well used. The data should be used collaboratively by schools and colleges to:

- Define profiles of successful or graduating college students and, conversely, define characteristics of non-successful students

- Set goals and measure progress toward increasing student preparation to enter college

- Enroll and retain more students through college graduation

- Identify the financial and other supports that students need to enter and succeed in college

- Improve student academic performance (as reflected by various assessment measures) in school and college

- Improve the quality of students' educational experiences in elementary, secondary and postsecondary institutions.

This broader use of data, specifically providing some high school "outcome" measures, may prove to be an effective catalyst for accelerating school reform as well as a vehicle for bringing state education systems together to set common goals for student performance.

5. *Intervene early to increase aspirations and preparation*

Ensuring that all students succeed at every level of education will require early outreach and intervention. Those in higher education need to be actively engaged with schools and communities if they are to help students achieve success. Two disturbing trends appeared in the 1980s — first, the growing number of freshmen unprepared to handle a collegiate curriculum, especially in such fields as mathematics and composition; and second, the declining participation of large numbers of urban minority and rural students. These students are discouraged from pursuing a college education for many reasons, including rising college costs, poor preparation and poor quality schools, and the absence of peers who aspire to go to college.

State higher education agencies are joining with state departments of education, two-year college systems and local communities to adopt strategies to build students' aspirations and keep them in school. These efforts encourage students to seek postsecondary education as well as prepare them for the rigors of the college curriculum. They have several characteristics which should serve as models for state and national early intervention efforts. For example:

- The efforts involve a great deal of collaboration with local communities. The programs rely on peers and community leaders — not

professional educators — to serve as mentors.

- They organize students into social groups to provide reinforcement.
- They bring young people onto college campuses at an early age to give them a flavor of what college life is like and help improve their academic skills.
- They engage parents to provide further support and motivation.
- In some cases, they combine a social contract between the student and the state.
- They seek to build a political coalition in state capitals to increase public support for education at all levels.[25]

The Rhode Island Children's Crusade for Higher Education is a comprehensive statewide initiative combining academic motivation and financial incentives for students to stay in school and complete a higher education degree. Involving students and their parents, the program offers the state's third graders a full four-year tuition scholarship in any of Rhode Island's public and independent institutions if they complete school and follow other contractually agreed-to conditions. A key element of the program is the establishment of a nonprofit foundation that oversees the management of an endowment fund. The endowment is supported through private contributions, funds allocated by the state, the Board of Governors for Higher Education and an annual fund-raising event. It will continue through a partnership of federal and state governments, colleges, universities, proprietary schools, business and industry, unions and foundations.

Mississippi's Project 95, which is aimed at improving college preparation of its school students, conducts financial aid workshops for families in the communities where they live. The state also provides grants for school-college collaborations, faculty exchanges, teacher recruitment and training and special minority access and retention programs such as student outreach centers, college counseling and student mentoring. The project is a joint effort of the state higher education board, the board for community and junior colleges, the state department of education and local businesses.

Another state-level effort, New York's Liberty Partnerships, provides skills assessment, tutoring, family counseling and enrichment activities to keep stu-

dents connected to school and learning. School-college partnership grants provided by the Arizona Minority Education Access and Achievement Cooperative provide pre-collegiate guidance and counseling to middle school and high school students, research internships for community college students and college coordinators that introduce college opportunities to elementary school children and their parents.

The Ohio Postsecondary Education Demonstration Program is a community-school-college collaborative aimed at institutionalizing local commitment to student achievement. The program coordinates local planning, state and local resources and local leadership around issues of student success.

In Colorado, the University of Southern Colorado and Pueblo School District 60 recently entered into a partnership to improve the community's pre-K to baccalaureate education systems. The goals of this alliance are to restructure both the schools and the higher education institution by focusing resources, leadership and creativity on curriculum, teaching, administration and support services.

The alliance is defined and guided by a contract between the two governing boards. Projects and strategies will be developed through a broad-based strategic planning process involving the school district and the institution as equal partners. Structural changes under way include:

- The integration of administrative resources, with the superintendent of the district designated vice president/superintendent and reporting both to the president of the university and the board of education

- The integration of curriculum and teaching resources by such methods as dual credit, faculty exchanges and joint curriculum planning groups

- Fundamental restructuring of the university's teacher training programs, with the establishment of a Center for the Advancement of Teaching and Learning.

The premise for another Colorado effort called the V.I.P. Student Program is that high school students need more indepth orientation to postsecondary requirements and opportunities than that provided by annual college recruitment visits. The program is a voluntary part-

nership of 20 high schools and 12 public and private colleges and universities. Beginning with the freshman class students are exposed to the higher education community through campus visits and workshops conducted by college and university staff. Another activity designed to involve high school faculty supports release-time for visits to college campuses to work with admissions, financial aid and academic counselors from the partner postsecondary institutions. Also, parents participate through meetings and workshops at the school site with college and university financial aid and admission counselors. In its first year, the V.I.P. program connected almost 7500 students, 2000 parents and 1700 teachers and administrators to college campuses across the state.

The Percy Julian Project is a partnership between Eastern Illinois University, Lake Land Community College and Chicago's Percy Julian High School. Its purpose is to improve the general academic preparation of African-American junior and senior high school students and to increase their awareness of and interest in postsecondary education. "Rising" seniors from Percy Julian are selected to attend a five-week summer residential experience specifically tailored to enhance their preparation for entering baccalaureate programs. The students enroll in intensive English, math, social studies and physical education classes.

In 1989, the program was expanded to include a "rising" ninth-grader component. Students are selected from the seven Percy Julian feeder junior high schools to participate in a two-week summer residential program. In addition to class work for both groups, the program provides for senior students to tutor freshmen and exposes students to social and intellectual experiences on campus. Several high school teachers are selected each year to accompany the students and participate in all aspects of the program. The program was partially funded from a Higher Education Cooperation Act Minority Educational Achievement Grant administered by the Illinois Board of Higher Education.

A school-college collaboration at Arizona State University, called the Hispanic Mother-Daughter Program, targets eighth-grade girls and their mothers. The primary goal is to intervene early in the educational development of these young women before they make choices that may limit their career aspirations and educational options. The program consists of a support network, academic preparation, discussions with parents, efforts to en-

hance self-esteem of participants and follow-up support.

6. *Share facilities, technology and faculties*

Today's challenges — technological changes in society, demographic movement, work-force training requirements — all call for education systems that can quickly adjust to changing client needs and demands. Schools and colleges that work independently cannot adequately provide the level of services that communities require to be strong and economically competitive. Innovative partnerships between colleges and schools can enhance education reform by creating active-learning opportunities, motivating students and rejuvenating faculty in higher education as well as K-12.

Many cooperative school-college relationships exist. Unfortunately, most are isolated programs that have not achieved school- or institution-wide commitment. Yet, given their quality and creativity, they should be encouraged and used as prototypes for expanding new partnerships across the country.

Some of these partnerships bring faculties together to share curriculum; others provide college-level instruction to precollege students; others using new technology allow schools and colleges to learn new teaching techniques or to provide instruction to a greater number of students. Among the variety of programs:

- Academic alliances bring college faculty and teachers in the same disciplines together to share resource materials, explore new technologies, review textbooks and other classroom materials, work on common administrative and curriculum problems and jointly sponsor scholarly activities for students and teachers. More than 350 local alliances exist with over 7500 school and college faculty participating.

- A lack of modern chemistry laboratory equipment and minimally prepared teachers in rural high schools created the impetus for a state-funded program in Illinois called the Secondary Chemistry Instrumentation Laboratory Network. A cooperating network of modern chemistry instrumentation laboratories has been set up at Western Illinois University, Knox College and Sangamon State University. Through the network, summer inservice training workshops are provided for chemistry teachers

who learn lab experiments that can be completed within the 40-50-minute time constraint under which most high schools operate. In addition, throughout the academic year, students may attend one of the three network labs to conduct advanced experiments high schools are not equipped to offer.

- The goal of the California Mathematics Project is to improve math instruction at all levels. Operating in several project sites, it includes the selection of experienced elementary and secondary mathematics teachers to participate in summer institutes held on college campuses. The focus of the institutes is to provide participants opportunities to build problem-solving skills, develop leadership and form networks through which teachers and college faculty may share resources and successful teaching approaches.

- Syracuse University's Project Advance offers accredited college courses taught in high schools by high school faculty. The program offers many advantages, including sharpening students' skills for full-time college study and giving them real-life expectations of college demands. Students also earn course credits or exemptions which allow them to either accelerate their academic program or take courses outside of their major. Third, through association with the university, the high school faculty becomes a knowledgeable resource for the entire school.

- In Maine, the combination of large land area and sparse population made development of a community college system almost impossible. In 1989, the Community College of Maine/ Telecommunications System was developed by the University of Maine System. It allows courses for high school, college, business training or specialized staff development to be transmitted from any University of Maine campus to off-campus centers and to high schools and other locations throughout the state. The system offers interactive live classes and meetings, national and international teleconferences and a variety of seminars and workshops. It represents a partnership of the University of Maine System, the Maine Vocational/Technical Institute System, Maine Maritime Academy and Maine's Department of Educational and Cultural Services.

- In Oklahoma, the state's Talkback Television System offers college

courses to schools in remote locations and other sites. Satellite instruction is offered by Oklahoma State University to meet the course needs of some rural high schools and also to meet continuing education needs of teachers. The system is a collaborative effort of the state regents for higher education, the state department of education and the department of vocational and technical education.

- The Minnesota Educational Computing Corporation, through its Center for the Study of Educational Technology, provides practical and timely assistance to classroom teachers who use computers. The center is a partnership of three universities and seven local school districts. It supports the work of collaborative research teams consisting of classroom teachers, university researchers, graduate students and others. The center focuses its efforts in four areas: the effective use of technology in instruction, the role of technology in restructured schools, the value of technology in school organization, and the effective design of educational-technology products.

- The federal government's Star Schools Program provides grants to telecommunications companies that will work with schools and colleges to develop distance learning programs. The effort helps schools in small, remote or otherwise disadvantaged areas have access to upper-level or college curriculum in areas such as math, science and foreign languages. One program in Missouri, for example, provides schools with Oklahoma State University instruction.

7. *Create an integrated curriculum in math, science and other fields*

Teaching methods in schools and higher education are inextricably linked. Teachers learn their teaching practices and techniques from colleges and universities. According to John Goodlad, teachers tend to talk *at* rather than *with* their students. He says that new teachers are predisposed to teach this way because their own teachers taught them in this manner. Then, during their training they are apprenticed to teachers who continue to teach the same way.[26] Therefore, any move to change the way teachers teach in the schools — to incorporate "hands-on" instruction, problem solving or to integrate "real world" applications — has to be accompanied by a simultaneous change in teacher preparation.

This principle applies for all disciplines, but seems especially relevant to the mathematics and science fields. Both of these fields have projected shortages of professionals and need to enhance recruitment. Both also need to strengthen curriculum to encourage more students to consider math- and science-based career goals. States have reacted by increasing math and science courses required for graduation and college admissions. Some school reformers argue that these state policies merely set general guidelines for K-12 curriculum and miss the mark in influencing partnerships between schools and colleges that could promote critical teaching and learning objectives.

Project 2061. What is needed is a reassessment of what is taught, how it is taught and where it is taught. One example of how this restructuring should occur was profiled in a recent report by the American Association for the Advancement of Science. Science for All Americans (part of the organization's Project 2061) recommends that:

- All students leave school with an awareness of what the scientific endeavor is and how it relates to their culture and their lives.

- All students develop a set of cogent views of the world as illuminated by the concepts and principles of science.

- All students see the scientific endeavor in the light of cultural and intellectual history and become familiar with ideas that cut across the landscape of science, mathematics and technology.

Although the report focuses only on elementary and secondary education, the recommendations for how instruction should be changed are equally applicable to undergraduate education. For example:

- Students should internalize some of the values inherent in the practice of science, mathematics and technology, especially respect for the use of evidence and logical reasoning in making arguments; honesty, curiosity and openness to new ideas; and skepticism in evaluating claims and arguments.

- Students should develop informed, balanced beliefs about the social benefits of the scientific endeavor — beliefs based on the ways in which people use knowledge and technologies and also on the continuing need to develop new knowledge and technologies.

- Students should form a positive attitude toward being able to understand science and mathematics, deal with quantitative matters, think critically, measure accurately and use ordinary tools and instruments (including calculators and computers).

- Students should develop communication skills, including the ability to express basic ideas, instructions and information clearly, both orally and in writing, to organize information in tables and simple graphs and to draw rough diagrams. Communicating effectively also includes the ability to read and comprehend science and technology news as presented in the popular print and broadcast media, as well as general reading skills.

- Students should form critical response skills that prepare people to judge the assertions carefully — especially those that invoke the mantle of science — made by advertisers, public figures, organizations and the entertainment and news media, and to subject their own claims to the same kind of scrutiny so as to become less bound by prejudice and rationalization.[27]

The principles of Project 2061 are being applied as isolated experiments in many schools across the country with reportedly great success. At Moorhead Elementary School in Indianapolis, for example, teachers across grade levels developed a program called "the invention convention." Students start by going to the library and reading books about inventors. Afterward, they write about people such as Thomas Edison or George Washington Carver in their daily journals. Each student chooses an inventor, writes a report and makes an oral presentation to the class. The final project requires every student to design and build an invention. When students have trouble translating an idea into a working model, the class breaks up into small groups to brainstorm — the way scientists in high technology companies might iron out the bugs in a new design for a computer.[28]

Making these necessary curricular changes will require retraining and support for teachers. Professional development programs for elementary and secondary teachers teaching in the math and science disciplines (such as those introduced earlier) can involve higher education in a cooperative process that builds teachers' knowledge of the subject and introduces new classroom activities and student-centered approaches. Illinois' Project STP (Student, Teachers and Parents) for

example, joins Sangamon State University, Lincoln Land Community College, Springfield College, the Springfield Urban League and the Springfield School District in a program designed to improve the mathematics achievement of middle school students. Some features of the program include:

- Inservice training for fifth- and sixth-grade teachers on how to teach problem solving in mathematics
- Provision of a college student teacher aide to assist each participating teacher
- Periodic evening meetings for parents to assist them in helping their children appreciate math
- Districtwide math contests and other extracurricular math activities for middle school students.

Now in its fifth year, the program has been so successful in improving achievement that the Springfield School District has adopted it for all fifth- and sixth-grade classes. In addition, the problem-solving approach to teaching mathematics has been incorporated into Sangamon State University's mathematics teacher preparation program.

Some of these professional development activities use resources and ideas from existing programs. For example, the federal government's Dwight D. Eisenhower Mathematics and Science Education Program provides funds for a wide range of professional development activities for educators teaching those subjects (K-12 through higher education).

The National Science Foundation (NSF) recently announced a national challenge grant project open to all states committed to supporting integrated, systemic changes in their education systems. The intent of the project is to "broaden the impact, accelerate the pace and increase the effectiveness of improvements in science, mathematics and engineering education in both K-12 and postsecondary levels."[29] Some expected outcomes include increasing student knowledge in math and science, developing the use of critical-thinking skills in students across education levels and creating an educational environment that will enable all students to understand how math and science (through the role and influence of technology) are related to the physical world and to the human condition.

8. *Create new structures and support for planning and collaboration*

If schools and colleges are going to work together effectively they will require new structures and financial support for those activities. The most effective way for these efforts to begin is through joint planning activities at the state level. Examples of these efforts include:

- For the first time, Idaho's plan for higher education includes goals that involve all three sectors: K-12, vocational education and higher education. The plan was built from the bottom up involving representatives from education, key legislators and representatives of the governors staff. The Idaho board (which has responsibilities for K-12 and higher education) will assign a permanent staff person to ensure implementation.

- In a Joint Resolution, the Kentucky General Assembly called upon the Council on Higher Education to work with the university community to outline how it will assist school districts in implementing changes called for in the state's school reform legislation. The steering committee for the project includes council representatives, university presidents, legislators and representatives from independent colleges. Their recently released plan examines ways to encourage faculty involvement in the schools and to revamp teacher education programs to train teachers and administrators in "site-based" management techniques.

- The Board of Trustees of the University of North Carolina System and the state board of education have met periodically over the past several years to conduct joint planning and to develop a reform agenda for teacher education. The result has been significant change in how teachers are trained.

- The Arizona Minority Education Access and Achievement Cooperative brings together in a formal compact three sectors that are critical to getting greater numbers of minorities through the education pipeline. Chief executives of the state department of education, the state community college boards and the board of regents have pledged to work together to involve community leaders and their own constituent institutions in a variety of cross-sector efforts.

- In Oklahoma, the state regents for higher education recently adopted

the Program for Excellence and Efficiency — an 18-point plan to improve the state's education delivery system. The program will use incentives to encourage cooperation across all levels of education and to achieve improved responsiveness, comprehensiveness, quality and efficiency of education programs and services.

These structures will help reduce the inherent organizational competition for state funds that exist between K-12 and higher education. If gains in funding of one sector are viewed as a loss for the other, states will be unable to achieve the public support that both sectors need to sustain reform. Nor will students be well served.

There are other ways to overcome the structural and financing impediments that stand in the way of collaboration. For example:

1. State boards (both K-12 and higher education) can include "school-college collaboration" as a specific budget priority for new funds and ask institutions to submit requests under this category.

2. Competitive grant programs can be established, using allocations from both the K-12 and the higher education budgets to encourage collaboration.

3. New education delivery systems can be created that break down the barriers between sectors. Tech-prep, sometimes called 2+2 programs, can be developed to bring the vocational curriculum of the 11th and 12th graders into an integrated program running through grade 14. Early enrollment and choice programs similar to those in Minnesota can be offered to high school students who wish to enroll in postsecondary institutions.

All of these efforts will bring the K-12 and higher education sectors into a closer and more cooperative working relationship. The result should be improved student learning and stronger public support.

REFORMING HIGHER EDUCATION: A PARALLEL AGENDA

The K-12 system is not the only sector that needs reform. There will be little lasting impact on the schools without changing the way in which colleges and universities do business. Like students in elementary and secondary schools, postsecondary students tend more often than not to be passive, not active, learners. The curriculum, like that of the schools, can be fragmented and devoid of the critical thinking and problem-solving skills needed by today's workers. Like the schools, higher education is not as successful as it needs to be in retaining and graduating minorities. Like the schools, it needs to reorganize structures and management systems to improve productivity and faculty effectiveness.

The next SHEEO report will examine these issues in detail, focusing on the changes needed in undergraduate education in America to achieve the national goals established by President Bush and the governors.

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